

B8 - Transport in Plants

Transpiration

Transpiration is the **loss of water vapour from leaves**

Water evaporates from the surfaces of the **mesophyll** cells into the **air spaces**

Then **diffuses** out of leaves through the **stomata** as water vapour

Affecting factors

Temperature

Direct proportionality, if temperature increases so does transpiration and vice versa

Temperature adds kinetic energy to particles so they move faster and evaporate easily

Wind speed

Direct proportionality, if speed increases so does transpiration and vice versa

Because wind causes water vapour molecules to move away faster, steeper conc gradient

Humidity

Inverse proportionality, the lower the humidity the higher the transpiration rate and vice versa

This has to do with the concentration gradient which is steeper when humidity is lower

Wilting

Wilting is the loss of rigidity of a non-woody plant

This occurs when the **turgor pressure** in plant cells falls (the cells become **flaccid**) as a result of there being less water in the cells

Wilting also serves to reduce water loss as it reduces leaves' surface area

Translocation

Translocation is the **movement of sucrose and amino acids in phloem from sources to sinks**

Sources are parts of plants that release sucrose or amino acids

Sinks are the parts that use or store sucrose or amino acids

Xylem and Phloem

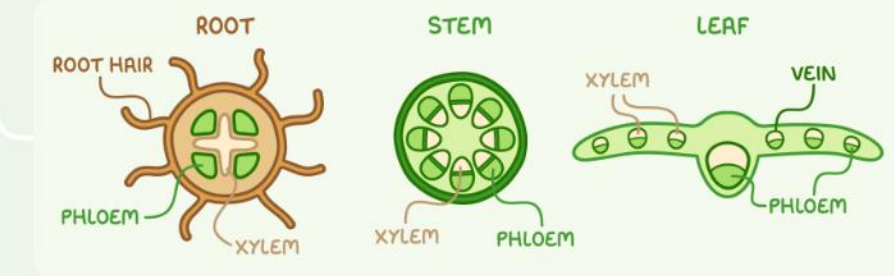
Xylem

Transport of **water** and **mineral ions**

Support

Phloem

Transport of **sucrose** and **amino acids**

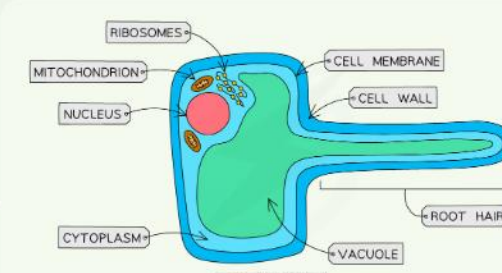


B8.1 Xylem and phloem

Core

- 1 State the functions of xylem and phloem:
(a) xylem – transport of water and mineral ions, and support
(b) phloem – transport of sucrose and amino acids
- 2 Identify in diagrams and images the position of xylem and phloem as seen in sections of roots, stems and leaves of non-woody dicotyledonous plants

Water uptake



Large surface area

Increases uptake of water and mineral ions

Root hair cells allow plants to maximize water absorption

Water enters root by osmosis; Minerals enter root by active transport

Pathway of water

Root hair cell

Cortex cell to cortex cell

Enters xylem

Transported to **mesophyll** cells in leaves

B8.2 Water uptake

Core

- 1 Identify in diagrams and images root hair cells and state their functions
- 2 State that the large surface area of root hairs increases the uptake of water and mineral ions
- 3 Outline the pathway taken by water through root, stem and leaf as: root hair cells, root cortex cells, xylem, mesophyll cells

B8.3 Transpiration	
Core	Supplement
1 Describe transpiration as the loss of water vapour from leaves	
2 State that water evaporates from the surfaces of the mesophyll cells into the air spaces and then diffuses out of the leaves through the stomata as water vapour	
3 Investigate and describe the effects of variation of temperature and wind speed on transpiration rate	4 Explain the effects on the rate of transpiration of varying the following: temperature, wind speed and humidity 5 Explain how and why wilting occurs

B8.4 Translocation	
Core	Supplement
1 Describe translocation as the movement of sucrose and amino acids in phloem from sources to sinks	
2 Describe: (a) sources as the parts of plants that release sucrose or amino acids (b) sinks as the parts of plants that use or store sucrose or amino acids	